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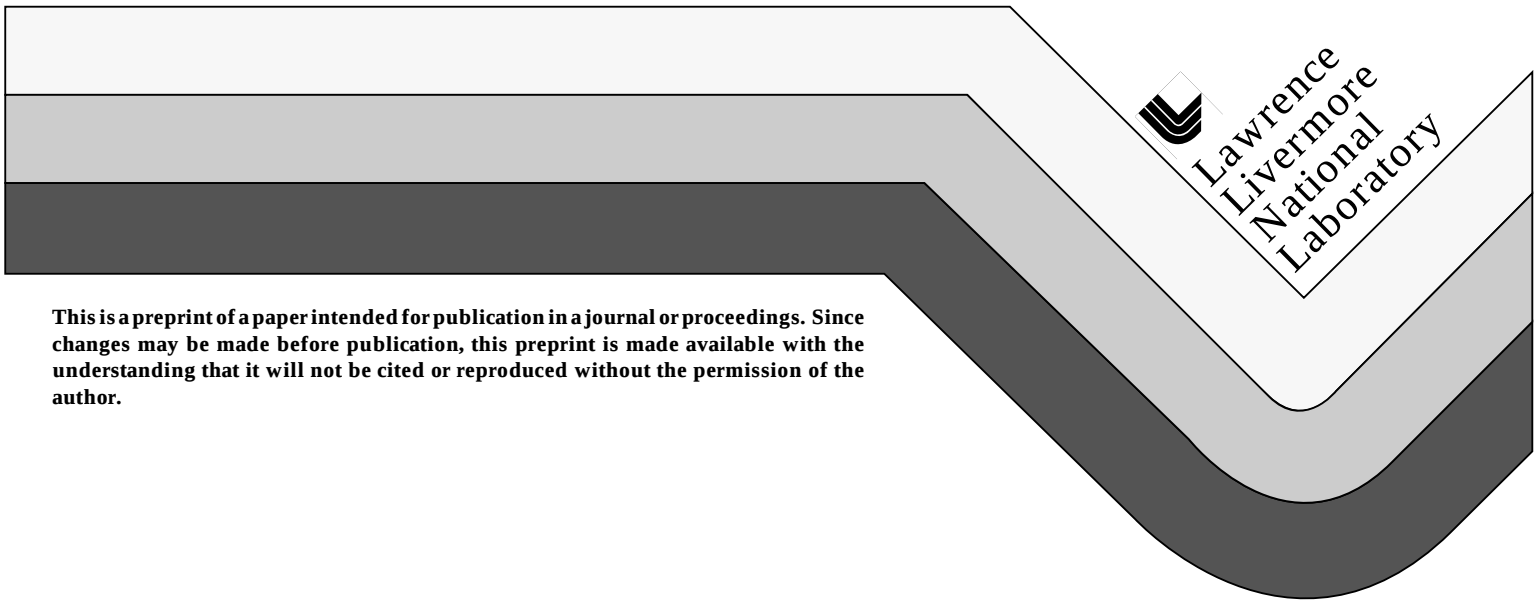

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Introduction

The International Council of Scientific Unions (ICSU) manages a project through its Scientific Committee on Problems of the Environment (SCOPE) designed to study radiation dose and health effects from the testing of nuclear weapons. This program, called Radtest, was initiated under agreement between the United States, the Soviet Union, and China. Since the breakup of the Soviet Union, the project has proceeded with the additional participation of Russia, the United Kingdom and France.

This program has convened two international meetings, both of which have been sponsored by NATO. The most recent one, which was held at Barnaul in Siberia, dealt with the impact of testing at Semipalatinsk on the Altai oblast in Russia. The third meeting, scheduled for March 1995 in Brussels, will reconsider the data that have been presented. There is a significant problem in that the suggested health effects which have been presented thus far do not match the collective experience of people in other countries in terms of the kinds of diseases that are indeed radiogenic and the extent to which they might be expressed. So the Radtest participants are looking forward to a reexamination of these data.

The general purpose of the Radtest program is to summarize all the data on radiation dose -- both on an individual and collective level -- that have resulted from nuclear weapons testing throughout the world, and also to consider the health effects that might have resulted from it.

Studies in the United States have essentially been completed, including a major dose reconstruction activity; most of these results have been published in Health Physics, with some more results currently in press. Meanwhile the epidemiological studies of leukemia and childhood thyroid disease are already finished and have been published in the Journal of the American Medical Association. It will probably take several years before the data from China, the Soviet Union and the United States are combined such that the entire impact of the testing of nuclear weapons is collectively reexamined.

The Current Status of US Cleanup Strategies

The statement has been repeated many times that the Cold War will not be over until the fuel cycle is complete, i.e. until issues of remediation and/or restoration have been adequately addressed. However, at the present time it is clear that the U.S. cleanup program is not working very well, at least from the viewpoint of risk remediation. In fact, the remediation program appears to have so many constraints and problems which entangle it in the enormous quagmire that it is, in reality, essentially unworkable.

In its current state the program cannot succeed without some kind of wholesale overhaul of the U.S. government legislative and regulatory posture. Congress understands quite well that the program is not working; this is evidenced by the requests that have been made in the past to define some of the very first principles, namely, what is the risk in the system? This risk factor and, subsequently, the necessary costs for cleanup are still unclear.

In fact, it is not certain whether the money being spent is accomplishing a reduction in risk or, indeed, increasing the risk, if not to the general public then to the workers involved in remediation efforts.

Interestingly, at one time the US Department of Energy boasted a ìmulti-attributeî system for the setting of priorities for environmental remediation. Two of the attributes in this system were health and ecological risk. One of the results of the application of that system was that no matter how much health or ecological risks were weighted, it was not a significant factor in driving the system. So one might conclude that this would have led to a wholesale reexamination of the program. However, that is not what happened. The outcome was that the priority-setting system was basically scrapped.

What, then, is driving the process? At the present time it seems to be compliance agreements as opposed to risk remediation, many thousands of which have already been set. In fact, many tens of thousands of milestones have been agreed to. But it is equally clear that the technical basis does not exist with which to actually complete these milestones.

Why compliance agreements, and so many of them at that? It is a difficult question which relates back to the critical issue of public outrage. The public was seriously distressed, for example, at some of the revelations which came out of Hanford on the release of iodine, information that was classified for many, many years. Citizens groups were further outraged to learn that one release in particular was very deliberate in terms of fulfilling some experimental design that has yet to be declassified.

Coupled with this is the very strong desire for social justice in the form of compensation to the communities who believe that they have been wronged, if not harmed. Finally one must take into account the systemís general bureaucratic inertia which tends to resist change of any kind.

Movement Toward Change

Despite the setbacks, it now appears that some very dramatic changes are in process. One year ago, Assistant Secretary Grumbly, whose job it is to deal with this very difficult issue, began talking about what he called the ìcoming train wreckî -- basically a serious collision between the budget constraints that were placed on the system by President Clinton and the real figures required to fulfill all of the compliance agreements and the many tens of thousands of milestones.

It is obvious that the ìtrain wreckî happened much sooner than Assistant Secretary Grumbly anticipated: now both Congress and the President are actually competing with one another to cut the budget. This creates a scenario whereby that which used to be a rather latent interest in risk assessment will, hopefully, blossom and indeed become a major management tool.

This presents some urgent needs, the first of which is a realistic assessment of the risk in the system. This assessment needs to be done with the full participation of the public and with the use of realistic models. Furthermore, the assessmentís result should contain an explicit statement of uncertainty.

Secondly, the need exists for an evaluation of ìcost versus benefitî in terms of reducing risk, both as a function of different levels of acceptable risk and with a complete evaluation of risk from the

cleanup process itself. That relates both to the risk that would be imposed on the public and, more importantly, the risk that might be imposed on the worker. Certainly it is not acceptable to take a very small risk to the public and remediate that by imposing a substantial risk on the workers.

One of the most important drivers for any kind of process like this is a proper evaluation of land use, because improper analysis may indeed increase the risk in the system. Digging up waste just to bury it somewhere else is not a very useful approach in the long run. Nor is the pump-and-treat method proving to be effective in achieving the end goal.

In defining a realistic risk level, the question of what constitutes an acceptable risk comes into play. In this authorís opinion, the Environmental Protection Agencyís goal of 10-6 , with an acceptable risk of 10-4 (which is then coupled to overly conservative and proscriptive risk assessment procedures), is simply not working.

What does a risk level of 10-6 over a lifetime mean? Put in another context, Bernie Goldstein deduced that the risk of dying from an aircraft crash is in fact 10-6 if you are on the ground. On a practical level, a risk level of that magnitude is simply not very helpful. Thus, it would seem unreasonable to pursue the application of such a risk level in the future if in fact it is costing billions and trillions of dollars to achieve.

So, obviously, the next need to address is defining an acceptable risk level that is balanced by the cost needed to achieve it. This is not a scientific question; rather, it is the responsibility of Congress or some other widely representative body. Once a definable acceptable risk level has been agreed upon, it is a very straightforward process to translate that to a concentration in soil, air, water, etc. This calls more for properly qualified scientists than fancy technology.

Ultimately, the final goal is not only to define these risk levels and make them practical but to explain this process to the public. That implies the necessity for a completely transparent process, with a few simple and comprehensible models, rather than an obscure one that is mucked up by contractors who propose a multitude of models. The public has stated very loudly and clearly that they

want a process of participatory risk assessment and not simply communication after the end result has been determined.

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